WHAT IS CLAIMED IS:

1. A lithographic projection apparatus comprising:

a projection system configured to project a patterned beam of radiation onto a target portion of a substrate;

an alignment system;

a control system configured to generate a control signal according to a predicted change in a time-varying property of a part of said apparatus; and

a comparator configured to compare a value based on the predicted change to a threshold and to generate a trigger signal when the value is greater than the threshold,

wherein said alignment system is configured to perform an alignment task in response to the trigger signal, and

wherein the threshold is adjustable.

2. The lithographic projection apparatus according to claim 1, wherein the alignment task includes obtaining a measurement of the time-varying property.

3. The lithographic projection apparatus according to claim 1, wherein the control system is configured to adjust the threshold according to a relation between a measurement of the time-varying property and a value based on the predicted change.

4. The lithographic projection apparatus according to claim 3, wherein the threshold is reduced in response to a determination that a distance between a measurement of the time-varying property and a value based on the predicted change is greater than a second threshold.

5. The lithographic projection apparatus according to claim 3, wherein the threshold is increased in response to a determination that a distance between a measurement of the time-varying property and a value based on the predicted change is less than a second threshold.

6. The lithographic projection apparatus according to claim 3, wherein the control system is configured to increase the threshold by an increment, and wherein the increment is adjustable.

7. The lithographic projection apparatus according to claim 6, wherein the increment is reduced in response to a determination that a distance between a measurement of the time-varying property and a value based on the predicted change is greater than a second threshold.

8. The lithographic projection apparatus according to claim 6, wherein the increment is increased in response to a determination that a distance between a measurement of the time-varying property and a value based on the predicted change is less than a second threshold.

9. The lithographic projection apparatus according to claim 1, wherein, in response to the control signal, the apparatus is configured to compensate for a change in the time-varying property.

10. The lithographic projection apparatus according to claim 1, wherein, in response to the control signal, the apparatus is configured to adjust a position of at least one among a mask having the pattern of the patterned beam, the substrate, and an element of said projection system.

11. The lithographic projection apparatus according to claim 1, wherein, in response to the control signal, the apparatus is configured to compensate for a change in the time-varying property relative to a most recent measurement of the time-varying property.

12. The lithographic projection apparatus according to claim 1, wherein, in response to the control signal, the apparatus is configured to compensate for a change in the time-varying property relative to a most recent performance of an alignment task.

13. The lithographic projection apparatus according to claim 1, wherein the time-varying property includes a temperature-dependent property of said projection system.

14. The lithographic projection apparatus according to claim 13, wherein the temperature-dependent property includes an optical property.

15. The lithographic projection apparatus according to claim 14, wherein the optical property includes a magnification.

16. The lithographic projection apparatus according to claim 1, wherein said alignment system is adapted to perform a first alignment task and a second alignment task that provides a larger number of measurements than the first alignment task, and

wherein said alignment system is adapted to perform the second alignment task in response to the trigger signal.

17. A lithographic projection apparatus comprising:

a projection system configured to project a patterned beam of radiation onto a target portion of a substrate;

an alignment system;

a control system configured to generate a control signal according to a predicted change in a time-varying property of a part of said apparatus; and

a comparator configured to compare a value based on the predicted change to a threshold and to generate a trigger signal when the value is greater than the threshold,

wherein the alignment system is configured to perform an alignment task in response to the trigger signal, and

wherein the control system is configured to determine a modified predicted change in the time-varying property based on a measurement of the time-varying property.

18. The lithographic projection apparatus according to claim 17, wherein the control system is configured to store a value based on the modified predicted change, and

wherein the apparatus is configured to perform an operation on a second substrate according to the value based on the modified predicted change.

19. The lithographic projection apparatus according to claim 17, wherein the control system is configured to determine a plurality of modified predicted changes in the time-varying property and to store a plurality of values, each based on a corresponding one of the modified predicted changes, and

wherein the apparatus is configured to perform an operation on a second substrate according to a selected one among the plurality of values.

20. The lithographic projection apparatus according to claim 17, wherein, in response to the control signal, the apparatus is configured to compensate a change in the time-varying property.

21. The lithographic projection apparatus according to claim 17, wherein, in response to the control signal, the apparatus is configured to

compensate for a change in the time-varying property relative to a most recent measurement of the time-varying property.

22. The lithographic projection apparatus according to claim 17, wherein said time-varying property includes a temperature-dependent property of said projection system.

23. The lithographic projection apparatus according to claim 22, wherein the temperature-dependent property includes an optical property.

24. The lithographic projection apparatus according to claim 23, wherein the optical property includes a magnification.

25. The lithographic projection apparatus according to claim 17, wherein said alignment system is adapted to perform a first alignment task and a second alignment task that provides a larger number of measurements than said first alignment task, and

wherein said alignment system is adapted to perform said second alignment task in response to said trigger signal.

26. A device manufacturing method using a lithographic projection apparatus, the method comprising:

providing a substrate that is at least partially covered by a layer of radiation-sensitive material;

using a projection system to project a patterned beam of radiation onto a target portion of the layer of radiation-sensitive material;

based on a predicted change of a time-varying property of a part of said apparatus at the time of a particular exposure, generating a control signal;

applying the control signal to adjust an aspect of the apparatus;

detecting when a value based on the predicted change exceeds an adjustable threshold; and

in response to said detecting, performing an alignment task.

27. The device manufacturing method according to claim 26, wherein the alignment task includes obtaining a measurement of the time-varying property.

28. The device manufacturing method according to claim 26, said method further comprising adjusting the threshold according to a relation between a measurement of the time-varying property and a value based on the predicted change.

29. The device manufacturing method according to claim 28, said method further comprising reducing the threshold in response to a determination that a distance between a measurement of the time-varying property and a value based on the predicted change is greater than a second threshold.

30. The device manufacturing method according to claim 28, said method further comprising increasing the threshold in response to a determination that a distance between a measurement of the time-varying property and a value based on the predicted change is less than a second threshold.

31. The device manufacturing method according to claim 28, said method further comprising increasing the threshold by an increment, and wherein the increment is adjustable.

32. The device manufacturing method according to claim 31, said method further comprising reducing the increment in response to a determination that a distance between a measurement of the time-varying property and a value based on the predicted change is greater than a second threshold.

33. The device manufacturing method according to claim 31, said method further comprising increasing the increment in response to a determination that a distance between a measurement of the time-varying property and a value based on the predicted change is less than a second threshold.

34. The device manufacturing method according to claim 26, said method further comprising, in response to the control signal, compensating for a change in the time-varying property relative to a most recent measurement of the time-varying property.

35. The device manufacturing method according to claim 26, wherein said time-varying property includes a temperature-dependent property of the projection system.

36. The device manufacturing method according to claim 35, wherein the temperature-dependent property is a magnification.

37. A device manufacturing method using a lithographic projection apparatus, the method comprising:

providing a substrate that is at least partially covered by a layer of radiation-sensitive material;

using a projection system to project a patterned beam of radiation onto a target portion of the layer of radiation-sensitive material;

based on a predicted change of a time-varying property of a part of said apparatus at the time of a particular exposure, generating a control signal;

applying the control signal to adjust an aspect of the apparatus;

detecting when a value based on the predicted change exceeds an adjustable threshold;

in response to said detecting, performing an alignment task; and

determining a modified predicted change in the time-varying property based on a measurement of the time-varying property.

38. The device manufacturing method according to claim 37, said method further comprising, in response to the control signal, compensating for a change in the time-varying property relative to a most recent measurement of the time-varying property.

39. The device manufacturing method according to claim 37, wherein said time-varying property includes a temperature-dependent property of the projection system.

40. The device manufacturing method according to claim 39, wherein the temperature-dependent property is a magnification.